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The Dzierzon Theory.

BY THE BARON OF BERLEPSCH.

No. VII.

PROPOSITION 10. If a queen remain unfecundated, she ordinarily does not lay eggs. Still exceptional cases do sometimes occur; and the eggs then laid produce drones only.

If the eighth proposition may be regarded as satisfactorily established by what I have submitted in relation to it, hardly any one will be likely to question the correctness of what is advanced in the one now to be considered. The two are in fact in complete accordance with each other. It will be sufficient to show that unfecundated queens do occur, which actually lay eggs from which living drones, and drones only, are developed. Dzierzon mentions a number as having come under his observation. Hitherto I have found only one, which, as it was a remarkable case, I shall refer to somewhat in detail.

On the 13th of March, 1852, I examined a colony of bees which had been confined to the hive, by stress of weather, since the 16th of January, and found it contained a very large amount of drone-brood. I was thus induced to transfer the colony to an observing hive. The operation was undertaken by Günther and myself, and at an early stage of it, we found an active and apparently healthy queen, whose wings were slightly defective. We placed her and the major part of the remaining workers in the observing hive, which had been furnished with an empty comb; and gave them about half a pound of slightly diluted honey, which was carried up in the course of the night. On the following morning we found some eggs in the cells, and soon after saw the queen laying. She had deposited twelve eggs—which she accomplished in three minutes and two seconds—when I removed and immersed her in alcohol, designing to send her for dissection to Dr. Barth, the editor of the Bienenzeitung. The hive from which she was taken contained 1132 living drones, 892 sealed drone chrysalids, 499 larvæ and 122 eggs. The worker and drone-cells had been alike supplied with great regularity. The queen was of the preceding summer, having issued with a second swarm. I never before saw a hive so largely and exclusively stocked with drones and drone-brood.

The queen reached Dr. Barth on the 18th of March, and he reported the following as the result of his examination:

"Her external form and appearance were those of a perfect queen. The defect in her wings noticed by you, must have been very slight, as it could no longer be observed when she was taken out of the liquor in which she was immersed. On opening the abdomen, the ovaries were seen fully developed and the ovarian tubes were densely charged with eggs, which had the size and semblance of those laid by a fecundated queen. No difference whatever was observable even under the microscope. I next proceeded to search for the spermatheca, using the utmost care in dissecting the parts, but after the most minute scrutiny, *none could be found.* This fact is of special significance, as showing that this important organ was either totally wanting or so slightly developed that it could not be detected. This was a remarkable peculiarity in a queen producing drone-progeny exclusively."

This examination, by so competent a person, I conceive, fully settles the main question. But when first promulgating his theory, Dzierzon was of opinion that such unfecundated drone-egg lay-

ing queens were of rare occurrence. Though, as before stated, I have myself hitherto discovered only one, I am strongly disposed to doubt this, and inclined to think that they are by no means uncommon. In the course of the numerous experiments I made some years ago, to determine whether the drones are males, and to ascertain whether the fecundation of the queen takes place within the hive or not, I remember distinctly that many of my experimental colonies became drone-producing *in the presence of a queen.* But as I then firmly believed that the drone-eggs in every colony were laid by a special class of workers, it never occurred to me to investigate how those drones originated. But now, since numerous and incontrovertible facts have constrained me to adopt a different view, and convinced me that *ordinarily* no fertile worker is tolerated in a hive having a queen, whether she be fecundated or not, I cannot but surmise that those drones proceeded from eggs laid by unfecundated queens; and that, consequently, such drone-producing queens are of more frequent occurrence than is commonly supposed. Every intelligent and curious apiarian may, however, readily determine the matter for himself. Let him take a dozen second swarms and clip the wings of the queens; see how many of the colonies become drone-producing; and then carefully ascertain whether the eggs from which those drones proceed are laid by the queen, or by a fertile worker in her presence.

PROPOSITION 11. If, in consequence of superannuation, the contents of the spermatheca of a fecundated queen become exhausted; or, if from enervation or accident, she lose the power of using the muscles connected with that organ, so as to be unable to impregnate the passing egg, she will thenceforward lay drone-eggs only, if she lays at all.

The evidence of this is furnished by the following facts:

On the 30th of June, 1857, Mr. Kehrhahn sent to Professor Leuckart a queen fecundated in July, 1854, which, thenceforward to the fall of 1856, displayed an extraordinary degree of fertility, having in the interim laid several hundred thousand eggs. But in the spring of 1857, she laid drone-eggs exclusively. On dissecting her, Prof. Leuckart could not discover a single spermatozoid in the contents of her spermatheca—the supply having been so completely exhausted, in the course of three summers, that the queen could no longer impregnate an egg.

In May, 1854, when placing a queen in a cage, I accidentally compressed her abdomen violently. Though she appeared to have sustained no external injury and speedily regained her usual activity, and recommenced laying in worker-cells with her accustomed regularity when replaced in her hive, the eggs produced drones only. Either her spermatheca was crushed by the compression, or severed from the oviduct; or she was thereby deprived of the use of the muscles connected with the parts.

This occurrence subsequently induced Dr. Dönhoff to make an experiment, to ascertain whether the same effect could be produced by intentional mechanical compression of the rings of the abdomen. The queen thus operated on, though previously producing worker-eggs, thereafter produced drone-eggs only.

This will suffice to show that queens may still be sufficiently vigorous to lay eggs, though utterly incompetent to lay any which will or can produce a worker.

PROPOSITION 12. As some unfecundated queens occasionally lay drone-eggs, so also in queenless colonies, no longer having the requisite means of rearing a queen, common workers are sometimes found that lay eggs from which drones only proceed. These workers are likewise unfecundated; and the eggs are uniformly laid by some individual bee, regarded and treated more or less by her companions as their queen.

1. *In queenless colonies, workers sometimes occur which lay drone-eggs.*

This is no longer doubted or denied by intelligent apiarians who have had ordinary experience in bee culture, and have properly used the opportunities for observation which they have enjoyed.

2. *But drone-egg-laying workers are found only in colonies which no longer possess the requisite means of rearing a queen.*

There may be some rare exceptional cases, but ordinarily this is true. In colonies which have no queen, but have worker-eggs, unsealed worker-brood, or larvæ in royal cells, no drone-eggs are laid. In colonies which remain or become queenless after sending out a swarm, and in swarms which become queenless, drone-eggs are not laid immediately after the loss or deprivation has occurred, even though they ultimately become drone-producing stocks. Generally some considerable time elapses before drone-egg-laying begins, as will be shown when considering the next proposition.

3. *The eggs laid by fertile workers produce perfect drones.*

I firmly believe this, because the drones thus

produced, precisely resemble, in every respect, those bred in colonies having fully fertile queens. I have no direct and positive evidence to adduce, indeed, though I can indicate a process by which it may be ascertained whether they really possess the attributes of virility. So soon as it is observed that a queenless colony contains drone-eggs or larvæ, let the combs be taken out successively, brush off the bees into a suitable box, immerse them in water, and carefully pick out all the drones, so as to be sure that all those which may have been hatched from eggs laid by their late queen are removed. Then replace the combs in the hive and return the bees after they have become dry, adding to them, if they be few in number, a reinforcement of workers taken from some other colony, and carry the hive to some isolated location, where neither wild nor domestic bees are found. Ere many days, drones emanating from eggs laid by a fertile worker will make their appearance in the cells. Now take out the combs again, brush off the bees, return the combs to the hive and introduce in it an unfecundated queen with a suitable number of workers, from among which all drones have been carefully removed. Then immerse in water the bees which were brushed from the combs, pick out the drones and place them in the hive containing the unfecundated queen. Confine and carry away the immersed workers. Leave the hive in its isolated location; and if under these circumstances the queen becomes fully fertile—that is, capable of laying worker-eggs, then the perfect virility of drones hatched from eggs laid by fertile workers, will be at least *highly probable*. I say highly probable, for it would still not be absolutely certain, because various unanticipated casualties or occurrences may throw doubt on the reliableness of the result, and render a repetition of the experiment, under more favorable auspices, necessary or desirable.—I would suggest to beekeepers favorably situated, to institute such an experiment for their own satisfaction and for the elucidation of the truth.

4. *The drone-egg-laying workers are not fecundated.*

Prof. Leuckart dissected a large number of fertile workers sent to him by Dr. Dönhoff and myself, and though he found perfectly formed eggs in the ovarian tubes of all of them, the spermatheca in each was merely rudimental and so imperfectly developed that it required the aid of a microscope to detect it, and contained no trace of sperm or seminal matter. It was thus clearly demonstrated that these bees were neither fecundated nor susceptible of fecundation. Prof. Von Siebold, who likewise dissected some fertile workers, and fully corroborated the statement of Prof. Leuckart, remarks that "the peculiar structure of the worker's abdomen precludes concourse with the male."

5. *The drone-eggs found in queenless colonies are all laid by one individual.*

This may not be universally true; but according to my observations, it is generally the case. Last September, I divided a queenless drone-producing colony into two nearly equal parts. Eggs continued to be laid in only one of them.

6. *The bees of the colony regard and treat the fertile worker more or less as their queen.*

This is evident from the circumstance that it is, in many cases, almost impossible to detect the queenless condition of a colony from external appearances or the general deportment of the workers. These frequently will labor as industriously, carry in pollen as plentifully, and defend their hive with as much spirit and pugnacity, as if they had a healthy and prolific queen. They will neglect to rear a queen from eggs or larvæ when introduced, and reject and kill a fertile queen when offered to them. This can only be explained on the supposition that the bees regard the fertile worker as a genuine queen.

7. *The fertile workers which make their appearance in queenless colonies, are not designedly reared by the bees, but occur casually only, and must be regarded as abnormal or exceptional productions.*

They originate mainly when a colony undertakes to rear young queens, especially when the old queen has been suddenly lost or removed. A number of royal cells are then hastily started, and some of them afterwards abandoned, the larvæ having meanwhile fed with royal jelly. The development of the sexual organs, and more especially of the ovaries, is thus probably stimulated, and though supplies of such nutriment are subsequently withheld, the capacity to lay eggs more or less freely has been conferred. I have frequently marked the worker-cells thus incipiently transformed, and know that they were reconverted to their original form and character, their inmates being again treated like simple worker-larvæ as at first, though I saw that royal jelly had been lavishly introduced. Such cells may readily be distinguished even after their reconversion, as the bees cap them with a broader and more convex cover than ordinary worker-cells.

Huber conceived that workers reared in the vicinity of royal cells, may occasionally receive a portion of the royal jelly, and thus be stimulated to fertility. Dzierzon concurs in this view, in so far as it may account for the production of fertile workers in some instances; but believes also that they may and do originate in various other modes.

Every hypothesis, however, yet submitted from any quarter, rests chiefly on the assumption that development has by some means been over-stimulated for a brief period; and as the result affects the sexual organs more especially, the quantity and quality of the food administered have been looked to as the exciting cause.

PROPOSITION 13. *So long as a fertile queen is present in the hive, the bees do not tolerate a fertile worker.* Nor do they tolerate one while cherishing the hope of being able to rear a queen. In rare instances, however, exceptional cases occur. Fertile workers are sometimes found in hive *immediately* after the death or removal of the queen and even in the presence of a young queen, *so long as she has not herself become fertile.*

On the 17th of July, 1852, the young queen reared in a colony from which a swarm had issued was lost; and on the 18th another colony in similar circumstances lost its queen. The first was in a common straw hive, from which the combs could not be lifted. On the 29th of July, I cut them out and found neither eggs nor larvæ in the cells. I transferred the bees to a small hive furnished with combs in frames, and on the 9th of August, eggs were seen in the cells—being twenty-three days after the queen was lost.

The second colony was in a movable comb hive. I examined the combs on the 29th of July, but found no eggs; nor could any be discovered on the 9th of August; but on the 20th, the cells contained a number of larvæ. Here, five or six days more must have elapsed, than in the first case, before egg-laying began.

I might cite a number of other instances showing, like these, that usually egg-laying by fertile workers does not commence till some time after the bees cease to cherish the hope of rearing a queen.

I have, however, one instance showing that a fertile worker must have commenced laying at an earlier period, and have continued it for some time after the bees had begun to rear a queen. On the 29th of May, 1853, I drove out a swarm from one of my hives, and twenty days thereafter sealed drone-brood was found in the parent hive, which emerged on the thirty-third day after the driving. But on a further examination of this hive on the same day, I found a fine fertile queen, plenty of eggs, and some newly hatched larvæ. Allowing twenty-four days for the development of a drone, the drone-eggs must have been laid within nine days after the driving; and, as it would seem, several days after the bees had begun to rear a queen, because the worker-larvæ selected for that purpose must have been in a cell not yet sealed, when the transformation was undertaken. This, indeed, cannot but be regarded as an exceptional case, but it shows that a fertile worker may commence laying almost immediately after the loss or removal of the queen, and may be continued during the rearing of another, and probably till the one so reared has herself become fertile.

WORKERS SHORT-LIVED.

The age to which worker bees *may* attain is not easily ascertained, and opinions differ widely respecting it. But since the introduction of the Italian bee, we may readily determine how old they usually get to be. If the native queen of a common stock be removed about the middle of May, and a fertile Italian queen substituted, we shall scarcely find one common worker among a thousand on examining the colony about the first of August ensuing. If the substitution be made about the end of July, the proportion of common workers remaining at the end of October will be about one-fourth or one-fifth of the whole number. It is, hence, evident that the duration of life in the case of workers, is greatly dependent on the season. When forage abounds and bees are industriously gathering stores, their span of existence appears to be comparatively short; and we may estimate that during the height of the honey season, they do not, on the average, live longer than five or six weeks; though they perish more from accident and exhaustion than from actual old age.

☞In order to ascertain what influence the *size* of the cells exerted on the development of the larvæ reared in them, Huber selected a drone comb containing eggs and larvæ, all of which he removed, replacing them with worker larvæ one day old. This comb, thus prepared, he inserted in a hive containing a healthy queen. The bees at once took charge of the brood, and in due time capped the cells with covers nearly flat, and entirely different from those of drone cells. Eight days after the capping he took out the comb and examined the brood. They proved to be worker nymphs, more or less advanced to maturity; but entirely similar, both in form and size, to such as are bred in worker cells. From this he inferred that the size of the cell does not, of itself, determine the sex, as Knauff and others had alleged.

☞The Austrian bee-keepers estimate that bees need as much honey to carry them safely from Candlemas to spring, as was required to support them from the preceding fall to Candlemas.

Bee Culture in Common Hives.

No. I.

BY F. W. GUNDELACH.

There is scarcely any topic on which so many treatises have appeared as on the management of the honey bee, that useful and interesting insect, which man in the earliest periods of history withdrew from its native forests and partly domesticated.

It would seem, therefore, hardly possible to add anything new or useful to the collective mass of observations and facts already treasured up in those numerous publications. Yet I conceive that, from my own experiments and experience, I have gathered some results not generally known, and which are of substantial value in rendering bee-keeping profitable—as a comparison of my apiary with others in my neighborhood, has for years past conclusively shown. My present purpose is to elucidate specially only those points, with but brief incidental reference to aught beside.

Many persons are of opinion that no artificial processes are admissible in bee-culture; and that the best results are attainable only by him who simply cleanses the bottom board of his hives in the spring, feeds such of his stocks as appear to need it, hives the swarms when they naturally issue, and in the fall brimstones the heaviest and the lightest. I am of a different opinion, and can adduce a striking example that a more scientific management will insure greater and more certain profit.

In the year 1838, having sold my gardens, I removed my bees to the premises of my brother-in-law—an admirably adapted location. I placed my apiary only four yards distant from his; and it so happened that we then had each the same number of stocks, viz: *nine*. My brother-in-law devoted much time to his bees, but managed them according to the above-mentioned simple method. I, on the other hand, invariably drummed out the first swarms, and treated my bees according to the teachings of my previous experience. The number of my stocks increased from year to year, so that when, after the lapse of four years, I again purchased ground for a garden, I was prepared to establish a second apiary there, which gave me the advantage of being able to place my forced swarms at a distance from the parent hives. In the spring of 1847, my brother-in-law had only one feeble stock remaining, which soon after perished; whilst I increased my stocks that year from sixteen to forty-two; and in the fall of 1851, they had been multiplied to more than ninety—having yielded yearly also an ample supply of honey and wax.

APIARIES AND HIVES.

The best position for an apiary is one fronting the southeast. It should be so placed that the flight of the bees is not obstructed; though this is not absolutely necessary, as they will always manage to find their hives. It is better to locate an apiary in a valley than on high ground, that when the bees are returning heavily laden they may be saved from a toilsome upward flight. Yet they may properly be placed in the upper story or even in the roof of a house situated in the valley; because the bees, when returning, rise high enough in the air to *clear* any trees or other high objects in their course, and descend only when they arrive in the immediate neighborhood of their hives. But it is not proper thus to place stocks intended for natural swarming; because, the swarms are then apt to alight in places difficult of access, and are also more prone to make their escape to the woods. I have, however, often placed swarms, after hiving, in a garret, and they labored there with remarkable industry.*

It is an advantage, where an apiary contains several stories, that each of these be sufficiently high to admit of one hive being placed on another. This is very desirable, both when forced swarms are to be made, and when two or more stocks are to be united.

As respects the hives themselves, I regard those as the best which are composed of straw rings or sections, each twelve inches in diameter and four inches high. These facilitate the removal of the surplus honey, as the upper section may easily be separated or cut off by means of a thin wire. The top or cone may then be replaced, and the honey obtained will generally be found nearly pure or free from pollen. If the removal be deferred till about the end of September or beginning of October, when the nights are cool, very few bees, if any, will be found in the section removed, especially if it be done early in the morning. If it be intended to preserve the section with its contents till the ensuing spring, to be then given to a forced swarm as an *outfit*, it will be well to shift it halfway round after it has been severed by the wire,

* "*Remarkable Industry.*"—If this is correct, *why* is it so? It is well known from experience that hives occupying an isolated position, are pre-eminently industrious, and thrive particularly well. It seems, also, to be contrary to nature to congregate a large number of stocks in close proximity, at the same elevation, and all fronting in one direction. When the construction of the hives, and other circumstances admit of it, the stocks should be distributed as far apart as possible. Hence, it is *not the elevation* at which a stock is placed, but the *isolation of its position*, that confers the advantage- B.

so that the combs may cross each other; and let it remain thus a day or two. The bees will immediately lick up the honey from the disrupted cells and store it elsewhere; and though they will also reunite the combs where they touch each other, a separation is readily effected again, by prizing the sections asunder with a chisel. When drawing the wire through between the sections to cut them apart, care must be taken to draw it *transversely* through the combs, and if possible, with an equal strain on each—as a lateral application of the wire would be apt to compress the combs against each other, and force much of the honey out of the cells. If the combs run from front to rear, as is generally the case, the wire must be drawn from the front to the rear, or from rear to front.

Hives composed of straw rings or sections, possess this important advantage also, that space properly suited to the size of each swarm can be given to it—if weak, giving it only two sections, or only one when necessary. If a swarm be put in a hive too large for its numbers, it will be unable to maintain therein the requisite degree of warmth; its combs will be irregularly built, and it will increase very slowly. Finally, these composite hives, have this good quality likewise, that a section may be removed from below, in the spring, thereby confining the bees in a smaller space, and thus keeping them warmer.*

As second best, I regard *entire* straw hives one foot in diameter, and fifteen inches high. The first twelve inches should be uniform in diameter, and thence the top be regularly arched, with a hole 2½ inches wide in the apex. Each hive should have a wooden hoop around its base.

I do not consider wooden hives as so serviceable, since they do not afford so good protection against cold, as straw hives—the straw enclosing much air, which is a bad conductor of heat, and hence the interior heat, produced by the bees cannot so readily escape. Wooden hives also contract much moisture in winter, causing mouldiness of the combs, and otherwise disagreeably affecting the bees. Besides, wooden hives rarely fit so closely to the bottom board, as straw hives do.

* In the use of straw hives, I likewise prefer those which are divisible, but I would recommend sections fourteen inches in diameter, and eight inches high. Three such sections will form a hive, and surplus honey is procured from such stocks, y adding *scaps* or *supers*, or by placing in the rear a hive or box having a covered communication with the main hive. The removal of sections from above and replacing them by others inserted below, I do not approve of. When supers are to be used, the covers of the hive should be flat, with a hole 3½ inches in diameter in the centre. If a thin board of the same size with the cover and a corresponding hole be first placed thereon, and the super set on it, this may be removed in the fall, after a cool night, without disturbing a bee. But annexing a hive in the rear, is the preferable process. Swarming may, however, be more readily prevented by adding a super than by placing a hive in the rear. B.

[For the "Bee Journal."]

In the *Bee Journal* for March, page 66, is an article from the Rev. L. L. Langstroth, giving an account of an ocular demonstration by Messrs. Cary and Otis, of the copulation of the queen and drone-bee, which I can hardly endorse as correct. The position of the two, the drone clasping the queen around the body, &c.

The Author of Nature has so arranged the genital parts of the drone and queen, that it is physically impossible to make their genital parts meet, with the drone on the back of the queen. They must be reversed, and the queen clasping the drone with her legs, and driving the drone down in close contact with her body, with a quick motion the genitalia are thrown out into the vulva of the queen, by which means the copulation is accomplished—which it is known that the queen could not do if disabled in her legs or wings.

I will give my experiments on the subject. Some years since being desirous of learning in what manner the copulation between the drone and queen was accomplished, it occurred to me that by examining the sexual organs of the queens and drones, I could satisfy myself, by seeing how the Author of Nature designed them to be put together. I obtained drones and by a gentle pressure between the thumb and finger, it would cause them to throw out their genitalia, which curve over towards the back or head with a joint about one-third of the length from the end, which end curves downwards with double barbs at the under side at the joint, and is composed of a very thin membrane, and filled with compressed air, and the semen also thrown up (that was contained in the two horn-shaped sacs situated at the base of the genitalia,) with sufficient force to burst the end, and the semen is thrown out, leaving the inside casing of the sac, which is held by a thread-like tendon, attached at the base, the same as animals after giving birth to their young. On my theory, the workers that attend the drones on their excursions cause them to give off semen, which they convey to their hives to perfect queens, and also accounts for cause and use of so many drones, as they expire immediately on giving off their semen. Any one doubting the above experiments and results, will please communicate any experiments of theirs going to disprove the correctness of my position.

E. KIRBY.

Henrietta, N. Y., June, 1861.

☞Bee culture can only be regarded as truly "the Poetry of Rural Economy," when it is prosecuted not merely as a source of pecuniary profit, but also as a perennial fountain of intellectual enjoyment.

[For the "Bee Journal."]

I respectfully beg leave to say a few words to my beekeeping friends, through the *American Bee Journal*, in regard to comb guides, as that is a subject of vital importance to every one who attempts to keep bees on the more scientific principles of the present age.

And also being myself a zealous advocate of the movable comb class of bee-hives, I have been greatly gratified and pleased with the articles brought out already by our valuable "Journal" on the subject of comb guides.

I have used for three seasons, strips of comb stuck on the upper or top piece of the frame as a comb guide, and I am so highly pleased with the plan that I cannot refrain from giving my experience to others whom it may concern, as I believe that articles from practical men, in the cultivation of bees, is the way in which the science of apiarian pursuits will be most speedily advanced, bringing beekeeping to a more firm basis than it has heretofore occupied in our country; for I have full confidence in the inventive genius of our American citizens.

I also believe that if our energies are rightly directed that ere many years this country will stand out as prominent in beekeeping as she does in many other things.

Our advance already in bee hives reminds me strongly of the language of our late Commissioner of Patents, in regard to inventions, that "No sooner are the American people informed that a certain improvement in anything is wanted, than some man steps forward with the very thing needed."

But, to the subject we started on. The way I proceed is this: take some pan or skillet, and melt in it rosin and beeswax in the proportions of two parts of rosin, and one part of beeswax. Your vessel ought to be eight or ten inches wide, to give room for slipping in the comb.

Then select fine meshed brood comb, having ready a sharp knife; oil the blade of the knife, so that it will pass through the comb without clinging to it, first having the comb at the proper temperature, that it will not break. You must also see that you have not your comb too warm, or it will be easily mangled. When things are all right, your knife will slip through the comb very perfectly, leaving the strips straight and in good order. Your strips ought to be about three-fourths of an inch wide. Have the top piece of your frames flat; then slip the strips of comb in your melted wax, and set them straight on the frames, and they will stick tight almost as soon as they touch, so that you can set each frame away as fast as it is fixed.

When you have things all in a state of readiness, you can fix a set of frames in a few minutes, and then you have, I think, the best comb guide that can be used almost, for several reasons. In the first place, you have given the bees a start of the right kind of fine meshed comb, worker-brood comb; again, you have a comb on or in each frame, as straight as a rule, which is a very desirable thing.

Then the animal heat of the hive is not absorbed or hindered by partitions of wood or metal between the combs, which new natural swarms dislike very much; and you economize the use of the old or waste combs about your bee yard.

I used this method of comb guides last season in about fifty hives, and I do not think that I had one crooked comb in the lot.

I am certain that if that kind of comb guide is properly put on and used, that you will attain to a very high perfection in straight combs—in fact, almost all that a person could wish or desire.

FLEMING MCCONNELL.

[For the Bee Journal.]

MR. EDITOR.—In response to a request from J. F. L., in the *Bee Journal* of June, "stating as a farther help towards a solution of the second query, if beekeepers who have large hives that might have contained old honey, would communicate their observations on this point through the *Bee Journal*, we might perhaps, after a while, arrive at some definite conclusion."

Now, I would simply state, that in the winter of 1859 and 1860, I wintered five swarms of bees, from which, during the season, I obtained ten young swarms, which I hived in ordinary box-hives with drawers in top. The most of them apparently did well, and one of them took the first premium at the County Fair. When winter set in I removed them to the south side of the house under the stoop; supposing they had honey enough to keep them, I paid no more attention to them until January, when on looking, four of them had died, together with two of the old ones, and the other five just alive, without a particle of honey left; the remaining five I fed a few days, when they died also. The three old hives remaining had about thirty pounds of honey each from 1859, and had a good supply still, this spring, and are now doing well. I should infer from what was said about dysentery, that my bees had it, they would discharge their fæces all over the hive, inside and outside, also on the comb, some of which grew mouldy and very offensive to the smell.

Canoga, N. Y., June 18, 1861. B. F. B.

☞ *Please send us the names of beekeepers.*

(For the "Bee Journal.")

The following, I believe to be the true history of the reproduction of the honey-bee, as instituted by the wisdom of the Creator.

1st. The workers in their flight with the drones alight on the drones' backs and cause them to give off their semen, which the workers lick up and carry to their appropriate cells in their hives, for the purpose of propagating the young queens. See what nature has done to accomplish that design, in so constructing the drone, that by a slight pressure of the abdomen, by the legs of the worker or queen, (or the fingers) to throw out the genitalia—if the worker is clasping the body, it being physically impossible to enter the body of the worker, and by a joint in the genitalia towards the end it passes near the back of the drone and bursts, giving off semen which is held by the barbs at the joint, and the drone instantly dies, leaving the worker to obtain the semen. In this, the drone is like some plants, when ripe; with a slight pressure, the seed vessels explode and throw off the seed.

How the queen obtains semen in her spermatheca is not known, except that the queen occupies the top instead of the bottom in her copulation with the drone. The above theory shows the use and wisdom of God in causing so many drones at times, and the mystery made plain in the perfecting of queens in the absence of drones, by the impregnated worker-larvæ with semen. The worker takes the semen thus obtained, and impregnates the embryo worker-larvæ in royal cells, which fecundates the ovary of the immature queens, in order to give life to her drone progeny. She then comes forth fully prepared to lay eggs that produce drones only. She must fly out before becoming fully fertile and a perfect queen, and have a connexion with the drone and her spermatheca filled with semen, in order that she may be able to impregnate the drone eggs, as they pass her spermatheca, and the eggs so impregnated produce the workers, and from the worker-larvæ, after being impregnated with the drone semen procured by the workers, produce the queens. Dzierzon and Prof. Von Siebold in their theories as to the production of drones by parthenogenesis—that is without the male sperm—are not giving the true history; and had the truth relative to the fecundating of the ovary of the immature queens been understood, the naturalist would never have yielded the point that the drone might be produced without the male sperm; for it is well known a portion of the animal secretion remains in the royal cells after the queen leaves, and her ovary is fully fertilized for the production of drones.

The Rev. Mr. Kleine and others could not explain the phenomenon of hybridizing between the Italian and common bee; but everything relating to this subject is easily and satisfactorily explained by my theory.

A. KIRBY.

Henrietta, N. Y., June, 1861.

[For the "Bee Journal."]

Ed. Bee Journal.—Last summer I purchased a colony of bees in a common box-hive, to try my fortune in beekeeping. About the middle of August, I got it transferred to one of Langstroth's movable frame hives, and they did well.

Some time near the first of October, I divided the swarm, and so made two of them. Not getting them evenly divided, however, one proved to be very weak; and as it was very late, that one did not make honey enough to keep it the following winter. Consequently, as I neglected it too long before I examined it, I found them all dead. The other hive was strong and wintered well, and this spring have worked well, gathering both pollen and honey, as much as I could expect, seeing the spring has not been very favorable. About the 18th or 19th of May, I went to look at them, and found a quantity of dead bees, and now and then some dead brood, in front of the hive, which surprised me much; and on each succeeding day I found more dead bees. On the 21st, I opened the hive and found plenty of brood in various stages of both workers and drones, and considerable honey, but not a single royal cell could I find; and then I found that the bees were killing off their drones (the dead bees being all that kind). I wish to know if this is common. Also, if anything can be done to induce them to multiply colonies, as I wish to increase my stocks; or whether it would do to divide them. Any information through the *Bee Journal* will be gratefully received by an inquirer after truth.

A. A. COLE.

Flowerville, May 25th, 1861.

M. DE GELIERE says he frequently had colonies which being unduly supplied with drone comb, produced a greatly disproportioned number of drones. He caught and killed more than five thousand drones, on one occasion, from a single hive. When flying, they appeared to be more numerous than the workers. Though really largely in the minority, they produced vastly more noise and confusion.

☞Though I am decidedly in favor of full liberty of speech, I am of opinion that, in reviewing the opinions of others, we ought to use this liberty with the utmost circumspection. We should, according to an ancient sage, "have the tongue in the heart, and not the heart on the tongue," lest by hasty and inconsiderate expressions, the feelings of others be wounded.—DZIERZON.

☞*Please send us the names of beekeepers.*

(From the "London Quarterly.")

The Honey Bee.

(FIRST MODICUM.)

How the little busy bee improves each shining hour—makes hay when the sun shines—makes honey, that is, when flowers blow—is not only a matter for the poet and moralist and the lover of nature, but has become an important subject of rural, cottage, and even political economy itself. If West Indian crops fail, or Brazilian slave-drivers turn sulky, we are convinced that the poor at least may profit as much from their bee hives, as ever they will from the extracted juices of parsnips or beet-root. And in this manufacture, they will at least begin the world on a fair footing. No monopoly of capitalists can drive them from a market so open as this. Their winged stock have free pasturage—commonage without stint—be the proprietor who he may, wherever the freckled cowslip springs and the wild thyme blows. Feudal manors and parked royalties, high deer-fences and forbidding boundary belts, have no exclusiveness for them; no action of trespass can lie against them, nor are they ever called upon for their certificates. But if exchange be no robbery, they are no thieves; they only take that which would be useless to all besides, and even their hard-earned store is but a short-lived possession. The plagiarist Man revenges himself for the white lillies they have dusted and disturbed, and makes all their choicely-culled sweets his own. But though he never tasted a drop of their honey, the bees would still accomplish the work that Providence has allotted them in fructifying our flowers and fruit-blossoms, which man can at best but clumsily imitate, and in originating new varieties which probably far surpass in number and beauty all that has been done by the gardening experimentalist since the days of Solomon. Florists are apt to complain of the mischief the bee does in disturbing their experiments and crossing species which they wish to keep separate; but they forget how many of their choicest kinds, which are commonly spoken of as the work of chance, have in reality been bee-made, and that, where man fructifies one blossom, the bee has worked upon ten thousand.

It is certain, however, that the great interest taken in bees from the earliest times, and which, judging from the number of books lately published, is reviving among us with no common force, has arisen chiefly from the marked resemblance which their modes of life seem to bear to those of man. Remove every fanciful theory and enthusiastic reverie, and there still remains an analogy far too curious to be satisfied with a passing glance. On the principle of "*nihil humani a me alienum*," this approximation to human nature has ever made them the favorites of their masters. And theirs is no hideous mimicry of man's follies and weaknesses, such as we see in the monkey tribe, which to us has always appeared too much of a satire to afford unalloyed amusement. Their life is rather a serious matter-of-fact business, a likeness to the best and most rational of our manners and government, set about with motives so apparently identical with our own, that man's pride has only been able to escape from the ignominy of allowing them a portion of his monopolized Reason, by assigning them a separate quality under the name of Instinct. The philosophers of old were not so jealous of man's distinctive quality; and considering how little at the best we know of what reason is, and how vain have been the attempts to distinguish it from instinct, there may be, after all, notwithstanding the complacent smile of modern sciolists, as much truth as there certainly is poetry and charity in Virgil, who could refer the complicated and wonderful economy of bees to nothing less than the direct inspiration of the Divine Mind.

Bees, indeed, seem to have claimed generally a greater interest from the ancients, than they have acquired in modern times. De Montford, who drew "the portrait of the honey fly" in 1646, enumerates the authors on the same subject, up to his time, as between five and six hundred! There are, to be sure, some apocryphal names on the list—Aristæus, for instance—whose works were wholly unknown to Mr. Huish; a fact which will not surprise our readers when we introduce him as the son of Apollo, the father of Actæon, the "peeping Tom" of mythological scandal. Aristæus himself was the patron of bees and arch-bee-master; but no ridicule thrown on such a jumble of names must make us forget the real services achieved in this as in every other branch of knowledge, by the Encyclopœdiast Aristotle—the pupil of him who is distinguished as the "Attic Bee;" or the life of Aristomachus, devoted to this pursuit; or the enthusiasm of Hyginus, who, more than 1800 years before Mr. Cotton, collected all the bee passages which could be found scattered over the pages of an earlier antiquity.

Varro, Columella, Celsus and Pliny have each given in their contributions to the subject; and some notion may be formed of the minuteness with which they entered upon their researches, from a passage in Columella, who, speaking of the origin of bees, says that Euchemerus maintained that

they were first produced in the island of Cos, though Euthronious asserted they originated in Mount Hymettus, and Nicander in Crete. Considering the obscurity of the subject, and the discordant theories of modern times, there is, perhaps, no branch of natural history in which the ancients arrived at so much truth. If, since the invention of printing, authors can gravely relate stories of an old woman, who, having placed a portion of the consecrated elements at the entrance of a bee hive, presently saw the inmates busy in erecting a shrine and altar of wax, with steeple and bells to boot, and heard, if we remember rightly, something like the commencement of an anthem—we really think that they should be charitably inclined to the older bee authors, who believed that they gathered their young from flowers, and ballasted themselves with pebbles against the high winds.

We shall have occasion to show, as we proceed, how correct in the main the classical writers are on the subject of bees, compared with other parts of natural history; but the book of all others to which the scholar will turn again and again with increased delight, is the fourth Georgic. This, the most beautiful portion of the most finished poem of Roman antiquity, is wholly devoted to our present subject; and such is the delightful manner in which it is treated, and so exquisite the little episodes introduced, that it would amply repay (and this is saying a good deal) the most forgetful country gentleman to rub up his schoolboy Latin, for the sole pleasure he would derive from the perusal. We need hardly say that no bee fancier will content himself with anything less than the original: he will there find the beauties of the poet far outbalancing the errors of the naturalist; and as even these may be useful to the learner—for there is no readier way of imparting truth than by the correction of error—we shall follow the subject in some degree under the heads which Virgil has adopted, first introducing our little friends in the more correct character which modern science has marked out for them.

The "masses" of every hive consist of two kinds of bees, the workers and the drones. The first are undeveloped females, the second are the males. Over these presides the mother of the hive, the queen bee. The number of workers in a strong hive is above 30,000, and of drones, usually about one to ten of these. This proportion, though seldom exact, is never much exceeded or fallen short of. A single family, where swarming is prevented, will sometimes amount, according to Dr. Bevan, to 50,000 or 60,000. In their wild state, if we may credit the quantity of honey said to be found in it, they must sometimes greatly exceed this number.

"Sweet is the hum of bees," says Byron; and those who have listened to this music in its full luxury, stretched the while on some sunny bed of heather, where the perfume of the crushed thyme struggled with the faint smell of the bracken, can scarcely have failed to watch the little busy musician

"With honey'd thigh,
That at her flowery work doth sing,"

too well to require a lengthened description of her; how she flits from flower to flower with capricious fancy, not exhausting the sweets of any one spot, but, on the principle of "*live and let live*," taking something for herself, and yet leaving as much or more for the next comer, passing by the just opening and the faded flowers, and deigning to notice not even one out of five that are full-blown, combining the philosophy of the Epicurean and the Eclectic;—or still more like some fastidious noble, on a grand tour, with all the world before him, hurrying on in restless haste from place to place, skimming over the surface or tasting the sweets of society, carrying off some memento from every spot he has lit upon, and yet leaving plenty to be gleaned by the next traveller, dawdling in one place he knows not why, whisking by another which would have amply repaid his stay, and still pressing onward as if in search of something, he knows not what—though he often fails to carry home the same proportion of happiness as his compeer does of honey.

"A bee among the flowers in spring," says Paley, "is one of the cheerfulest objects that can be looked upon. Its life appears to be all enjoyment: *so busy and so pleased.*"

The drone may be known by the noise he makes. Hence his name. He has been the butt of all who have ever written about bees, and is indeed a byeword all the world over. No one can fail to hit off his character. He is "the lazy, yawning drone" of Shakspeare. The

"Immunisque sedens aliena ad pabula fucus"

of Virgil. "The drone," says Butter, "is a gross, stingless bee, that spendeth his time in gluttony and idleness. For, howsoever he brave it with his round velvet cap, his side gown, his full paunch, and his loud voice, yet he is but an idle companion, living by the sweat of others' brows. He worketh not at all, either at home or abroad; and yet spendeth as much as two laborers; you shall never find his maw without a good drop of the purest nectar. In the heat of the day he flieth abroad, aloft, and about, and that with no small noise, as though he would do some great act. But it is only for his pleasure, and to get him a stomach, and then he returns presently to his cheer."

This is no bad portrait of the burly husband of the hive. He is a proper Sir John Falstaff, a gross, fat animal, cowardly, and given to deep potations. He cannot fail to be recognized by his broad body and blunt tail and head, and the "bagpipe i' the nose." He is never seen settling on flowers, except at the beginning of August, when he may sometimes be met upon a late blown rose, or some double flowers that workers rarely frequent, in a melancholy, musing state, as if prescient of the miserable fate that so soon awaits him. The occasion for so large a proportion of

"These lazy fathers of the industrious hive,"

is by some regarded as a yet unsolved riddle. One author fancies them to be the water carriers of the commonwealth. Some have supposed that the drones set, like hens, upon the eggs; in which case, the hair on their tails would seem to serve the same purpose as the feather breeches which Catharine of Russia had made for her ministers when she caused them, by way of punishment, to hatch eggs in a large nest in the ante-chamber. But this is mere fancy, the earwig being the only insect, according to Kirby and Spence, that broods over its eggs. Dr. Bevan denies that they are useful, or at least necessary, in keeping up the heat of the hive in breeding-time, which is the commonly received reason for their great numbers. Huber appears to have judged more accurately, when he thought so large a quantity were required, that when the queen takes her hymeneal flight, she may be sure to meet with some in the upper regions of the air.

Last in our description, but

"First of the throng, and foremost of the whole,
One stands confest the sovereign and the soul."

This is the queen bee. Her power was acknowledged before her sex was known, for Greeks, Latins and Arabs always style her "the king;" and it may be thought an argument in favor of monarchical government, that the "tyrant-quelling" Athenians and republican Romans, who almost banished the name with the blood of their kings, were forced to admit it to describe "the first magistrate" of this natural commonwealth. "The queen," says our quaint old author, "is a fair and stately bee, differing from the vulgar, both in shape and color." And it is amusing, that the most sober writers cannot speak of her without assigning her some of those stately qualities which we always connect with human sovereignty. Bevan remarks that "she is distinguishable from the rest of the society by a more measured movement;" her body is more tapering than that of the working bee; her wings shorter, for she has little occasion for flight; her legs—what would Queen Elizabeth, who would not even hear of royal *stockings*, think of our profaneness?—her legs unfurnished with grooves, for she gathers no pollen; her proboscis short, for the honey comes to her, not she to the honey; her sting short and curved—for sting she has, though she seldom uses it.

In addition to these, Huber and others have thought that they discerned certain black bees in many hives; but it is now generally allowed that these, if they exist at all, are not a different species, but individual workers which have suffered from hardship and exposure.

Having "caught our hare," got a good stock of bees, the next question is, where shall we place them? and there is little to be added to Virgil's suggestions on this head. The bee house should face the south, with a turn perhaps to the east; be protected from the north and prevailing winds; not too far from the dwelling, lest they become shy of man, nor too near, lest they be interrupted by him. No paths should cross its entrance, no high trees or bushes intercept their homeward flight. Yet, if placed in the centre of a treeless lawn, they would be apt in swarming to fly away altogether, so that Virgil rightly recommends the palm or some evergreen tree to hang over or near the hive. Another of his injunctions, which no modern writer seems to notice, is to sprinkle some neighboring branch, where you wish them to hang, with honey and sweet herbs bruised. Those who have been so often troubled by the inconvenient places in which swarms have settled, might do well to try the recommendation of the old Mantuan bee master. A quiet nook in low ground is better than an elevated situation: they have then their up-hill flight when their bodies are unburdened, and an inclined plane to skim down when they come home loaded with their hard-earned treasure. Rogers, at whose

"Cot beside the hill
A bee hive's hum could soothe the ear,"

has supposed the bee to be guided back to its hive by the recollection of the sweets it passed in its outward flight—a beautiful instance of "the pleasures of memory."

"Who guides the patient pilgrim to her cell?
Who bids her soul with conscious triumph swell?
With conscious truth retrace the mazy clue
Of varied scents that charm'd her as she flew?
Hail, Memory, hail! thy universal reign
Guards the least link of Being's glorious chain."

Whether this be the true solution or not, her return to her hive, so straight as it is, is very curious.

It seems that bees, like men, require a certain

quantity of saline matter for their health. "In the Isle of Wight, the people have a notion that every bee goes down to the sea to drink twice a day;" and they are certainly seen to drink at the farm-yard pool—

"the guilded puddle
That beasts would cough at—"

when clearer water is nearer; though the latter may be colder, and hence to them less palatable. Following the example of our modern graziers, a small lump of rock-salt might be a useful medicine-chest for our winged stock. Foul smells and loud noises have always been thought annoying to bees, and it is therefore deemed advisable never to place the hives in the neighborhood of forges, pig-sties and the like. Virgil even fancied that they disliked the neighborhood of an echo.

Next to the situation of the hive is the consideration of the bee's pasturage. When there is plenty of the white Dutch clover, sometimes called honeysuckle, it is sure to be a good honey year. The red clover is too deep for the proboscis of the common bee, and is therefore not useful to them. Many lists have been made of bee flowers, and of such as should be planted round the apiary. Mignonette, and borage, and rosemary, and bugloss, and lavender, the crocus for the early spring, and the ivy flowers for late autumn, might help to furnish a very pretty bee garden; and the linden, and the liquidamber, and the horse-chestnut, and the sallow, would be the best trees to plant around. Dr. Bevan makes a very good suggestion, that lemon-thyme should be used as an edging for garden-walks and flower-beds, instead of box, thrift or daisies. That any material good, however, can be done to a large colony by the few plants that, under the most favorable circumstances, can be sown around a bee house, is of course out of the question. The bee is too much of a roamer to take pleasure in trim gardens. It is the wild tracts of heaths and furze, the broad acres of bean fields and buckwheat, the linden avenues, the hedge-row flowers and the clover meadows, that furnish his haunts and fill his cells.

Pliny bids us plant thyme and apiastu, violets, roses and lilies. Columella, who, contrary to all authority, says that lindens are hurtful, advises cytisus, rosemary and the evergreen pine. That the prevalent flowers of a district will flavor the honey is certain. The delicious honey of the Isle of Bourbon will taste for years of the orange-blossoms, from which, we believe, it is gathered; and on opening a bottle of it, the room will be filled with the perfume. The same is the case with the honey of Malta. Corsican honey is said to be flavored with the box-tree; and we have heard of honey being rendered useless, which was gathered in the neighborhood of onion fields. No one who has kept bees in the neighborhood of a wild common, can fail to have remarked its superior flavor and *bouquet*. The wild rosemary that abounds in the vicinity of Narbonne, gives the high flavor for which the honey of that district is so renowned. But the plant most celebrated for this quality, is the classic and far-famed thyme of Mount Hymettus, the *Satureia capitata* of the botanists. This, we are assured by Pliny, was transplanted from the neighborhood of Athens into the gardens of the Roman beekeepers; but they failed to import with it the flavor of the Hymettic honey. The exiled plant, which, according to this author, never flourished but in the neighborhood of the ocean, languished for the barren rocks of Attica and the native breezes of its "own blue sea." And the honey of the Hymettus has not departed with the other glories of old Greece, though its flavor and aroma are said to be surpassed by that of neighboring localities once famous from other causes. While the silver mines of Laurium are closed, and no workman's steel rings in the marble quarries of the Pentelicus, the hum of five thousand bee hives is still heard among the thyme, the cystus and the lavender which yet clothe these hills. "The Cecropian bees," says C. Wordsworth, "have survived all the revolutions which have changed the features and uprooted the population of Attica." Though the defile of Thermopylæ has become a swampy plain, and the bed of the Cephisus is laid dry, this one feature of the country has remained unaltered.

"And still his honied store Hymettus yields,
There the blithe bee his fragrant fortress builds,
The free-born wanderer of thy mountain air."

The honey here collected used to be reserved for the special eating of the arch-bishop of the district, and but few travellers could even get a taste of it. Such was the case a few years ago; though recent occurrences must have tended to abolish the episcopal monopoly.

It has often been discussed whether a country can be over-stocked with bees. We believe this is quite as certain as that it can be over-peopled and over-manufactured. But that this is not yet the case in any extensive country, as far at least as the bees are concerned, we feel equally sure. Of course it is impossible to ascertain what number of acres is sufficient for the support of a single hive, so much depending on the season and the nature of the herbage; but nevertheless, in Bavaria only a certain number of hives were formerly allowed to be kept, and these had to be brought to an establishment under the charge of a skilful

apiarian, each station being four miles apart and containing 150 hives. This was centralization and red-tapery with a vengeance! A story is told that in a village in Germany, where the number of hives kept was regulated by law, a bad season had nevertheless proved that the place was overstocked, from the great weakness of all the swarms in the neighborhood. There was but one exception. This was the hive of an old man, who was generally set down as being no wiser than his neighbors, and this perhaps all the more, because he was very observant of the habits of his little friends, as well as careful in harvesting as much honey as he could. But how came his hive to prosper, when all the rest were falling off? His cottage was no nearer the pasture. He certainly must have bewitched his neighbors' hives, or made "no canny" bargain for his own. Many were the whisperings and great the suspicions that no good would come of the gaffer's honey thus mysteriously obtained. The old man bore all these surmises patiently; the honey-harvest came round, and when he had stored away just double what any of the rest had saved, he called his friends and neighbors together, took them into his garden, and said—"If you had been more charitable in your opinions, I would have told you my secret before,—

'This is the only witchcraft I have used;'"

and he pointed to the inclination of his hive—one degree more to the east than was generally adopted. The conjuration was soon cleared up; the sun came upon his hive an hour or two sooner by this movement, and his bees were up and stirring, and had secured a large share of the morning's honey before his neighbor's bees had roused themselves for the day. Mr. Cotton, who gives the outlines of the story which we have ventured to fill up, quotes the proverb, that "early birds pick up most worms," and draws the practical moral, in which we heartily concur, that your bed-room window should always, if possible, face the east.

☞An unsually early expulsion of the drones is not unfrequently an indication that the bees have voluntarily or instinctively discarded their old queen, and reared another; and that the combs contain sealed brood emanating from eggs laid by the latter.

☞The Rev. Mr. Göbel, one of the most experienced bee-keepers of Lusatia, a country long celebrated for its bee-culture, remarks that populous colonies, well supplied with honey and pollen, would pass the severest winter uninjured, even in *paper hives*.

(From the "Bienenzeitung.")

BOVIST OR PUCK BALL.

For the benefit of those who desire or may have occasion to employ this article, I communicate the following information: To obtain the fungus in its best condition, it should be gathered in July or August, and the larger kind having a yellowish-white or cream color should be chosen, as the small dark-brown kind is of no value. The larger kind is usually found in old pastures, meadows, and on the borders of forests, and is from four to eight inches in diameter. When gathered, it should be set in a box of dry sand and exposed to the sun to ripen properly, when it assumes an orange tinge. Before it attains a bright yellow color, it must be dried by artificial heat, or its value will be destroyed. This is done by placing it in a moderate stove heat, or in a bake-oven soon after the bread has been taken out. If properly dried it will remain spongy and soft, like spunk, and retain fire in the same manner. As this substance readily attracts moisture from the atmosphere, it should be kept in a dry place, and again specially dried in a moderate heat, before it is used.

The Italian borist, usually kept for sale by apothecaries, is said to be of superior quality—a piece as large as a hickory nut sufficing to stupify a colony of bees. Of the native borist, a piece the size of a hen's egg will be required for the purpose.

F. Nagdlburg, *Teacher.*

Schwedt, January 15, 1861.

[For the "American Bee Journal."]

ANT RIDDANCE.

We have made a very important and cheap discovery to keep ants from bees. Several years since the little red ants were very numerous in our cupboard, and we put stone coal against the end of the house opposite the cupboard, and it banished them all. We concluded it was the effect of the copperas in the coal. This spring the black ant began to annoy our bees, and we procured copperas out of the coal bank and put it around the bench legs, cleaned all the ants off of the bench, and there has not been one about the hives or bench since.

S. M. & E. S. Brigg.

Kirkwood Township, Belmont Co., Ohio.

☞Queens reared and fecundated before the middle of May, or in August and September, are said to be less prolific than such as are reared in the intermediate period.

The Italian Bee.

In February last, we obtained, through a merchant of Treviso, three genuine Italian colonies, direct from Mira.* The rude structure of the hives, the circumstances attending their transportation, the inclemency of the season, and the condition in which the colonies reached Munich, warrant us in ascribing to the yellow-barred race a remarkable degree of hardiness.

The Italian hives are about four feet long by one foot broad and deep, composed of half-inch boards roughly nailed together. One end of each was closed by a square piece of board, and the other was entirely open, serving for an entrance *in its whole extent.* In hives so rude, thin, and fragile, with the open end protected during the transit simply by a piece of woolen cloth drawn over it, these colonies (one of which was a weak second swarm,) arrived at Munich in a sound and healthy condition, after a long journey in a severe winter.

The hives were full of combs, built in an exceedingly irregular manner. As, in order to transfer the colonies to Dzierzon hives, it became necessary to break up these boxes entirely, the combs were, unavoidably, so damaged that it was impossible to arrange them satisfactorily at once in the new hives, the operation had to be repeated a few days later, when some new straight combs were substituted for a portion of the old ones. During this process, we had constant occasion to remark and admire the docility and gentleness of the bees. One of the colonies (a strong old stock,) contained a considerable surplus of honey, and though it was stored in old and dark combs, it was of a beautiful clear amber color, and peculiarly dense and tough, though not at all candied—resembling fine old turpentine in consistency. It was also much superior in flavor to common honey. These properties and peculiarities are, doubtless, attributable to the kind of pasturage from which it was derived.

Each of the three colonies *contained brood* so far advanced as to be sealed over in the cells. Not an egg could be found; the queens having, doubtless, ceased laying during their cold and protracted journey. They soon showed that they were fully reconciled to their new tenements, and displayed great activity and energy. Before the middle of March they began to build new combs, but in the advance made by them respectively there was more difference perceptible than could properly be accounted for by the apparent difference of the population of the several colonies. The strongest colony lagged much behind the next weaker one, both in comb-building and in the production of brood; but as this difference rapidly disappeared as the external temperature rose, it was, doubtless, the result of the difference in the warmth of their respective hives. The stronger colony had been placed in an ordinary Dzierzon hive made of poplar wood, and the top was shielded by a piece of board and an old blanket, so that it was probably as warm and comfortable as such hives usually are, especially as it was under cover in an apiary, and sheltered from the wind. The weaker had been put in a hive made under my father's direction, of one-inch linden boards, lined with stout straw matting, thus combining warmth with cheapness. Before the middle of April, this colony had built more than 325 square inches of new comb, and could supply brood to strengthen the third colony. The superior warmth of the straw-lined hive had doubtless caused the marked difference in the progress of these two colonies; for, after the weather became warmer, it became manifest that there was no difference in the fertility of the two queens.

But a much greater difference was seen between the progress of these colonies and that of our common bees. The latter did not begin to build comb before the end of April; and lest it be thought that the Italian bees had been especially cared for, I may say that whatever feeding with honey or meal was deemed necessary, was done in the open air; so that all our bees had access alike to what was furnished. Our domestic bees, being much the more numerous party, ought to have profited most by the opportunities enjoyed.

If the Italian race is distinguished for an earlier awakened impulse to activity and labor, it is remarkable also for visiting and foraging on many kinds of flowers and blossoms on which common bees are rarely, if ever, seen. Thus, the *Atabis Alpina,* (Alpine Rock-cress,) a very early blooming plant was frequented almost exclusively by the Italian bees. They also showed their superior agility and advantage in self-defence, and in repelling the attacks of robbing-bees. Nay, they would not tolerate the presence of other bees on combs which had been strewed with rye-meal for their common use. In all these particulars the palm of superiority must be conceded to them.

I will take the occasion to remark that Italian queens cannot, by the insertion of drone combs in their hives, be induced or constrained to lay drone

*Mira is a village, situated about midway between the cities of Venice and Padua. Dzierzon obtained his Italian bees from Madame de Prollius, of this village, who wrote to him for a model of his hives.

eggs much in advance of the period indicated by their own instincts and that of the workers. In the first place, the latter appropriate every vacant spot or corner, filling it with worker or brood combs, and using the drone combs exclusively for storing up honey; and, in the second place, the queens will deposit eggs in the poorest kind of worker comb, or wait patiently for the construction of new, rather than commence laying drone eggs prematurely. Nor will the bees apparently allow themselves to be diverted to any appreciable extent from the course seemingly prescribed by nature, either by abundant supplies of diluted honey, or by the increased warmth of their hives. With us, drone brooding did not begin till the weather became mild, especially at night, and a rapidly growing population admonished the colonies to prepare for swarming. Would it indeed be well if the habits of these insects were less unyielding? Should we not then have to refrain from feeding our stocks in the spring? And might not even kindly-meant protection from cold sometimes lead them into fatal mistakes? Should we not thus by the premature production of drones put at hazard the existence of the colony, or, at least, at times sadly interfere with its prosperity? But the undepraved and unaccommodating instinct of these bees guards them against such misfortunes. Hence, though I inserted drone-combs between the brood-combs before the end of March, and fed my colonies diligently, I saw no drone eggs before the 18th of April. As our common stocks do not yet contain any, we look forward with confidence to a satisfactory multiplication of the pure breed this season.

OTTO RADLKOFER, JR.

Munich, April 30, 1856.

☞On the 2d of February, 1845, an avalanche of snow fell upon and buried the apiary of the Rev. Mr. Imseng, of Lens, in Switzerland. With great labor he managed to recover all the hives, but one, which lay under a deep and dense mass of snow. At the end of March, the snow having gradually melted away, the top of the hive began to make its appearance, and he then carefully dug out the long missing stock. To his surprise he found the bees well preserved, and they throve better next season than any other colony on his stand. Might not bees be thus safely and conveniently wintered in northern districts, where snow falls deep and remains long on the ground?

☞Premature or inopportune sprinkling has sent many a swarm back in haste to its parent hive—or off into some "bosky bourne," beyond recovery.

[For the "American Bee Journal."]

REVIVING BEES.

I received the "American Bee Journal" for February. The article headed "CHILLED BEES," saved one swarm of bees for me; hence, I thought I was in your debt one dollar at least. I will tell you the circumstances: I had a swarm of bees that had to be fed this spring. I kept close watch and fed it every day with candy; but business kept me away one day longer than I had expected, and next morning when I went to see my bees, behold, they were dead. I commenced brushing them to the ground, but then the though struck me that I had seen an article on *chilled bees* in the "Bee Journal." I went and examined, and found that they could be brought to. I gathered the bees that I had brushed on the ground, found the queen and laid her on the top of a hive, then placed the rest of the bees with her, and set a glass box over them. In five minutes the queen and all the bees were alive; and they are now as good a hive as I have in my apiary of over forty swarms. I enclose one dollar in gold; please send me the "Journal," commencing with the January number. If you would send me an extra once in a while, I would dispose of it to advantage.

W. H. FURMAN.

Cedar Rapids, Iowa.

BEE FEED.

Dr. Alefield suggests that in districts where the *Agrostis stolonifera*, or common *couch grass*, abounds as a troublesome weed, it might, with little trouble, be got rid of, and at the same time made useful to beekeepers. Let the ground be ploughed in dry weather, the roots of the grass harrowed out, gathered, washed in running water, dried and preserved till the following spring. Then cut them up small, or *chaff* them in a common straw cutter, and boil them in water to extract the saccharine matter with which these roots abound. Drain off the liquid and boil it down to the consistence of syrup, and use the inspissated decoction to feed bees at the approach of spring. He conceived this would be the cheapest mode of procuring bee food when couch grass infests the soil; and that it would furnish supplies well adapted to carry bees safely through intervals of the season in summer when pasturage is scarce.

☞Intending to introduce a queen in a colony, Dr. Dönhoff stupefied the bees with the fumes of tobacco. The workers revived, with the exception of about one hundred. The drones, nearly a thousand in number, were killed by the operation.

(For the "Bee Journal.")

The answers you furnished on page 99 of "Bee Journal" for May, to questions which I proposed, are not quite satisfactory to my mind; and do not, as it seems to me, harmonize perfectly with the results of an analysis of royal jelly by Dr. Dönhoff, at page 36 for February. His report shows that his experiments were conducted scientifically, and with great care, and are therefore entitled to confidence.

In answering my questions in the May number, you say, "The error of our correspondent consists in supposing or assuming that drone sperm and royal jelly are both animal secretions, and substantially identical, whereas the former alone is an animal secretion, &c."

Dr. Dönhoff finds that the royal jelly contains animal albumen and fibrine, and their presence shows that the jelly is an animal secretion; and he further states that jelly is never found in the stomach of the bee. This decision goes to confirm an opinion of mine, published two years since, that the royal jelly is an animal compound possessing transforming and impregnating powers. It seems to me to be established beyond a doubt that the royal jelly is an animal secretion, and I shall wait with great interest for further proof to the contrary.

The royal jelly, you remark, is produced by a partial digestion in the chyle stomach of the worker, serving the purpose of nutrition, and adapted to no other purpose. This seems to me to be an error, and Dr. Dönhoff makes it clearly so. In his analysis he says, that royal jelly is never found in the stomach of the bee, and what you conceive to be the jelly is that part which goes to support nature in the growth of the larvæ, and is that food taken into the gullet or crop, is there brought into contact with the softening influence of the saliva or mucous, and is then disgorged as a nutriment for the young larvæ of the different sexes, (with the addition of semen to perfect the larvæ designed for the queen.) The same is the case with the pigeon and canary bird in preparing food for their young; and we might as well assume that the pigeon throws up partially digested food from its gizzard for its young, (which is an impossibility,) as to say that royal jelly is partially digested food in the chyle or second stomach of the worker, and disgorged for the use of the royal larvæ, which is also physically impossible. I shall leave this point for you to settle with Dr. Dönhoff, when he says it seems probable that the jelly may be found in the gullet of the worker. This being the case, the workers would always be able to perfect queens, while on the contrary it is a well-known fact that workers cannot always perfect queens when furnished with everything necessary for that purpose except semen.

You may say that animal and vegetable albumen are nearly identical. I admit it, but do not doubt Dr. Dönhoff's knowledge as to what kind it was that he analyzed. You invite me, if in possession of any scientific investigations exhibiting different results, to communicate them for publication: to this I would say, the Author of Nature, who gave to bees the laws of instinct and their propensities, has given a lesson for man to study, and when he has learned their true history, he has learned all that can be known on the subject.

It seems evident to me that the Creator had some further use for the drone than barely to fecundate the queen. I have carefully watched the drones and workers as they issue forth from the hive and take their flight together; they appear as if fired with the love of reproduction of their race. After many seasons of unsuccessful experiments, it occurred to me that it was the semen of the drone that the workers were in pursuit of. I caught a number of drones and held them in my hand until warm; then a gentle pressure between the thumb and fingers will cause them to throw out their penis, which is composed of a thin membrane, (my limits will not permit a description,) which bursting at the extremity, the semen is thrown out and held by double barbs at the joints of the genitalia, or drone's apparatus. I then placed them on a piece of board, and then procured working bees, the same as in hunting wild bees, and they licked up every particle of the semen thus extracted, and conveyed it to their hives. I repeated these experiments until perfectly satisfied. The next thing was to learn what use the workers put it to. It occurred to me that they used it in perfecting queens. I think my theory the only one that will satisfactorily explain what is now admitted to be the history of the bee, in accordance with the instinctive laws given them by the Author of Nature. And by looking at the subject from my stand-point of observation, the reproduction of the three kinds of bees becomes plain and rational.

I think that Dzierzon's theory is very correct on all points, except reproduction.

I will propose the following questions for consideration. What is it that is found in the royal jelly that is possessed of such impregnating powers as to cause the ovaries of the workers to produce drone eggs?

It has been known for three-quarters of a century, or more, that the workers could not at all times supply themselves with queens by being supplied with workers' eggs and larvæ, and they using every instinct that the Author of Nature has given them for that purpose. Now, what ingredient was wanting to perfect a queen? They were supplied with everything that seemed necessary, unless it was the semen.

Henrietta, June, 1861. E. KIRBY.

[For the "Bee Journal."]

Messrs. Editors.—I observe on page 129, *Bee Journal*, Mr. Langstroth's mode of procuring straight combs in his patent frames, which appears to me too complicated for many to use. I here wish to inquire if Mr. Langstroth or any of your readers ever tried wire cloth. Take a piece of cloth with the meshes sufficiently open for all the bees to pass conveniently through, the length of the frames and about two-thirds the depth—suspend between each frame, by a large wire that rests on the rabbets.

This appears to me will procure straight combs, and any person can easily arrange the wire with but little trouble or cost. I have never tried it, from the fact *my* bees build straight combs. I transferred about fifty stocks from the old box-hives last spring. The combs were so old but few were fit for use, consequently nearly all had to build new combs, and *only one* made crooked combs, but which could be easily taken out by an experienced hand.

Please give place to this, it may be of benefit to those troubled with crooked combs.

Since writing the above, I observe on same page (129) *Bee Journal*, you say, a young queen usually makes her hymeneal excursion on the same or the next day after hiving, &c., and on page 130, you say young queens do not usually leave on hymeneal excursions till eighth day. How is this? Does not the young queen lead off the second or after swarms on the day after leaving the cells? Please inform us.

I had twelve out of fifteen last season, in June, began to lay on fourth day after leaving cells, and three on fifth day. This season, in May, I had three kept back till fifteenth day by bad weather.

Yours, H. NESBIT.

Cynthiana, Ky., June 10, 1861.

☞ The cases referred to above differ essentially. Young queens accompany second or after swarms; but not unfrequently two or more young queens issue with a second swarm, and in such case, the hymeneal excursion is not made till one of them has been accepted or acknowledged by the bees, and all her rivals expelled or destroyed. This may involve a delay of a week or more, not from the time of swarming, but *from the time the queen left her cell.* But when only one queen accompanies a swarm which issues early and is immediately hived, she may leave for copulation on the same day that the swarm issued, though usually she does not leave till the next day—nor then, if the weather is unfavorable.

☞Please send us the names of beekeepers.

[For the "Bee Journal."]

THE AGE OF THE QUEEN.

Every apiarian should know, (as far as is practicable at least,) the age of every queen in his apiary.

Those who depend upon natural swarming, may save themselves much trouble, and frequently, the loss of a swarm, by knowing the age of their queens; or, from which stock to expect a queen, that will not fly—which she seldom fails to do, except when enfeebled by age.

When a swarm issues, if the queen is too old to fly, she drops to the ground, and (if not picked up and put with the swarm,) is usually lost, and the swarm returns to the hive, and must wait the same length of time that would be requisite to bring out a second swarm; and sometimes will not come out at all.

If the apiarian does not expect a feeble queen, the swarm will generally return to the old hive before he is aware that she cannot fly. Then his only alternative is, (if he finds her) to return her to the hive, and she will generally come out again the next day, if the weather is fair.

The queen will fly until she is four years old. At four she is too much enfeebled, and will generally, (perhaps always,) fail to fly, though her wings may appear to be whole. There may be instances when a queen will fail to fly from some other cause, but such very seldom occurs in natural swarming. The old queen is sometimes destroyed and a young one substituted. In such a case the queen might fly when she is supposed to be too old to do so. When such an instance occurs, I call her one year old, presuming that the old queen had been changed off the preceding year.

I will give my method of knowing the age of the queen.

An old stock that has cast a swarm last year, or an after swarm last year, will have a queen one year old.

I mark my hives thus, if a first swarm, on the 15th day of June:—

1st. June 15th, 1861—1. If an after swarm—thus, 2d, June 15th, 1861.

The last figure 1 denotes a first swarm, then the date, the last figure denotes the age of the queen.

A figure 2 denotes a second swarm, of course a young queen.

The hive from which the swarm came, I mark thus:—

1, June 15th, 1861, in another or different place on the hive, so that I can readily distinguish this from the mark at hiving.

By referring to this simple record on my hives, I am not at a loss when to expect a queen that will not fly.

C. COE.

Union Springs, N. Y.

[From the "Bienenzeitung."]

Introducing Queens, AND Uniting Colonies.

The excellent and infallible method of introducing queens safely among bees, at any time, recommended by Mr. Hübler, of Altenburg, was doubtless received with lively interest by every beekeeper—especially by those whose unsuccessful experiments with Italian queens were so mortifying and discouraging.

For thirty years past, I have availed myself of a process for this purpose, always attended with satisfactory results, no hostile attacks having been made on the queens introduced, nor any conflicts arisen between the bees of different colonies brought together, when this process was adopted. Judge of my surprise and gratification when I found that this specific employed by me when yet a tyro in bee culture, and tested hundreds of times by myself and my beekeeping friends, was the same precisely as that so strongly and justly recommended by Mr. Hübler, namely, *bovist*, or common puff-ball. But as Mr. H. does not describe the process as fully and minutely as the wants of the inexperienced require, I ask to be permitted to make some supplementary suggestions.

Mr. Hübler says: "When a queen is to be introduced in a colony, the bees are to be stupefied with the fumes of bovist, *but not the queen.* Why this, I do not know. I have often stupefied the entire population of five or six colonies, sometimes as many as eight, picked out the queens, found the workers together in one common mass, selected the choicest and fairest of the queens, gave her to the already partially revived workers, and invariably found that she was readily received and accepted. How would Mr. Hübler proceed to unite a number of colonies in the fall, without stupefying the whole *en masse*, and then removing the supernumerary queens?"*

He farther remarks: "The operation should be undertaken only in the evening, shortly before dusk." I have performed the operation at all hours of the day. All that is necessary is to allow the bees to recover *fully* from their stupefaction, before the hive is opened, because they may else be attacked by robbing-bees and overpowered. When only one colony is to be operated on, the process may be deferred till evening; but when a large number are to be taken in hand, as is often the case in the fall, especially in unfavorable years, it is necessary to begin the work earlier in the day in order to get through with it before dark.

Again, Mr. Hübler remarks: "The bees must not be confined while reviving, or feel as though they were under restraint, or they will commence fanning and humming violently, and many of them die from exhaustion." I generally let them hum a full hour, and longer, before I set them at liberty. It is, in fact, absolutely necessary to keep them confined a considerable time, as otherwise they will drop half stupefied from the hive, and perish miserably. They must, however, have plenty of air while confined.

Mr. Hübler says also: "They may at times indeed disgorge the honey with which their stomachs are filled; but this is of no consequence." Alas! no, my dear sir! this *is* of very great consequence. Bees should never be stupefied on a full stomach. Not only will they then besmear each other and become agglutinated together, but three-fourths of them will be suffocated, and we shall await their revival in vain. If, at a season of abundant pasturage, a queen is to be introduced, the colony should be fumigated *early in the morning*, before the bees have commenced work, and as slightly as is consistent with the required effect, or the whole colony may be ruined. For the union of entire colonies, at such times, other means are available, and no one should think of then employing bovist. At all other times, except very late in the fall when the bees have long ceased to fly, fumigation may be repeatedly resorted to without injury. By way of experiment, I have fumigated the same colony fourteen times in the course of three weeks, and yet it wintered quite as well as any other in my apiary.

Mr. Hübler proceeds: "When a virgin queen is to be substituted for a fertile one, the colony must first, by the removal of the latter, be made to feel its queenless condition, and the consequent excitement be allowed to subside." When I have succeeded in rousing a colony to full and poignant consciousness of its queenless condition, I need no longer resort to fumigation to introduce a queen safely. The advantage resulting from the use of bovist consists in this precisely, that no matter whether the colony is queenless or not, I can at once and without danger introduce among the stupefied bees any queen I may select, because they will certainly accept of her on reviving. I cannot, moreover, avoid expressing my surprise that Mr. H. makes this statement respecting virgin queens, when immediately after he proceeds to say: "I have in such cases never offered any

*According to Mr. Hubler's statement, the bees will themselves destroy the supernumerary or old queens, when one *that has not been stupefied* is given to them just before they recover from the effects of the fumigation.—Ed.

other than fertile queens. Whether a virgin queen would be accepted or not, I cannot say.*" If the colony still has a queen, she must be searched for and removed after fumigation, before the stranger is introduced; or it will happen, in eight cases out of ten, that the rivals will meet in mortal combat, and one be slain before the bees revive—for queens recover sooner than workers.

Since the summer of 1859 I have received eleven Italian queens from the Rev. Mr. Dzierzon. Each of these was given to the combined population of two or three fumigated colonies of common bees; and in no instance did the bees manifest the least animosity against each other or against the stranger cast among them. I availed myself of the occasion to acquaint Mr. Dzierzon with my process; taking pains to impress him with its infallibility, because I was aware of his repugnance to the use of bovist.

Mr. Hübler further says: "When a drone-breeding colony is to be operated on, no special preparation is necessary." But what special preparation is necessary in other cases? I at least know of none. It often occurs that I do not know five minutes in advance that I shall have occasion to resort to fumigation. I simply lift the hive from its bottom board, set it over the fumes of the fungus, and in eight minutes at longest, the operation is finished. The finding of the queens, indeed, is no slight task for an inexperienced operator. Commonly she lies near the top of the heap; but frequently too she remains suspended between the combs, and has to be brushed out carefully with a feather.

"Finally," remarks Mr. Hübler; "Fumigation with this fungus is the readiest and safest mode of strengthening colonies, by the introduction of bees from other hives. They will be received without hesitation." All very true; but of the mode of proceeding in the various cases that arise, Mr. Hübler says not a word. Now, though Klopfleisch and Kirscheret, Wurster, Christ, Knauff, and many others, have written on the use of bovist, I will describe the process somewhat minutely for the benefit of those beekeepers who are yet unacquainted with the operation.

Bovist or puck ball (*Lycoperdon bovista*) is a species of fungus which grows in almost all countries. It is usually found in rank pastures, rich and rather dry meadows, and on the margin of woodlands. There are various kinds of it, the more common rarely attaining the size of a walnut; another variety is about thrice as large and somewhat egg-shaped; but the best and most serviceable is frequently found as large as a man's head, weighing from five to ten pounds. Knauff seems to have been acquainted with the smallest kind only, for he says that two or three balls are sufficient to fumigate a colony.

To use this substance conveniently in bee culture, the requisite apparatus must be provided. This consists of a small brazier to hold coals, and a bottomless box from 14 to 16 inches square and the same in height. In the top of this box a circular hole 10 or 11 inches in diameter is cut; and inside, below the top, a smooth board 6 inches broad, is placed in an inclined position, to prevent the stupefied bees from dropping into the fire. A small hole is cut in the rear, closed by a sliding door, through which the brazier can be inserted underneath the inclined board. When to be used for fumigation, this box is set on a large bottom board, the hive to be operated on is placed on it over the circular hole, and a towel or other strip of linen tied around the base of the hive to prevent the smoke from issuing. Some glowing coals are now put in the brazier and a piece of the fungus about as large as a hen's egg laid thereon; the brazier is then set under the inclined board, and the apertures closed by the sliding door. As soon as the bees feel the effects of the ascending fumes, they will commence buzzing violently, and some will speedily drop on the inclined board and roll down to the bottom board. In about five minutes the buzzing will cease, and the hive should then be gently beaten with the bare hands, the more effectually to shake down the stupefied bees from between the combs. The hive should not be immediately lifted off, for the early admission of fresh air to the bees might be followed by their premature revival, and the difficulties of the operation thereby greatly enhanced. When the much greater portion of the bees have dropped (a large number will under any circumstances remain in and between the combs,) the hive may be lifted off and set on another bottom board, the brazier taken out of the box, and the bees gently brushed into some smooth vessel from which they can afterwards be readily poured out. While thus brushing in the bees, the queen should be looked for. She will usually be found among those which have fallen last.

The further process depends upon whether the fumigation is for the purpose of uniting two or more colonies, or merely for the removal of one queen and the introduction of another. In the former case, the bees should be as thoroughly shaken out of the hives as is practicable, gently pressing the comb asunder, and placing the bees of each colony in a separate vessel, removing all

*Mr. Hubler's remarks is restricted by him to the introduction of queens in *drone-breeding colonies*.—Ed.

the queens except the largest and fairest. Then the bees of all the colonies fumigated, whatever their number, are to be poured into the hives intended for them—commencing with those last fumigated, and proceeding in regular succession to the first—for those first fumigated will first revive. The queen selected for preservation, no matter to which colony she belongs, is to be placed in the top of the mass.

The hive should now be covered loosely with a piece of thin linen readily permeable by the air, but tied around the mouth so as to confine the bees. It should be left standing thus on end, till by a violent buzzing it becomes evident that the mass of the bees have revived, and the heat issuing through the cloth shows that longer confinement might be injurious. Now invert the hive, place two strips of wood about an inch square and fifteen inches long on a bottom board, set the hive thereon and untie the cloth. The bees will immediately begin to issue, and at first it may seem as if the entire population were about absconding; but they will speedily return and become quiet. The cloth and the strips of wood are not to be removed till next morning, when all will be found in order.

But if the fumigation was merely for the purpose of introducing or substituting a queen, it is not necessary, when the colony is queenless, that all the bees should be stupefied. It is sufficient if a portion of them drop, and the new queen may be introduced among these. But if there is a queen in the hive, the fumigation must be continued long enough to cause her to drop, that she may be removed before the other is introduced, or it may happen that the bees will retain her and destroy the one offered, or both may perish in combat, before the semi-conscious workers can interfere to prevent the royal conflict.

Of course no one will think of undertaking to unite two or more colonies of bees in a movable comb hive by means of fumigation; as the union can, in such cases, be effected by a much more convenient process.

If Mr. Hübler had discovered this safe and infallible method of operating, before he procured his first Italian queens, or had been made acquainted with it by those who had long previously tested and ascertained its efficacy, he would not have been vexed by the loss of ten or a dozen of those precious insects, besides retaining in his purse nearly one hundred dollars more of ready cash.

Some readers may think that I have been needlessly diffuse and minute in this communication; but I beg them to remember that I endeavored to describe the whole process so as to make it intelligible to and available by new beginners, and even older bee keepers, who have never practiced such manipulations.

KADEN.

Mayence, January 15, 1861.

DRONE RETENTION.

A colony which does not expel its drones at the time when all the other colonies in an apiary expel theirs, may be fairly suspected of queenlessness. Still I cannot concur with those who say that every colony which retains a few drones late in the season is certainly queenless; for I have in the course of my practice, found drones in some colonies in every month, though the result showed that each had a fertile queen. In good honey years, particularly, many exceptions to the general rule will be observed. In 1811, I found recently emerged drones on the alighting board of a virgin colony of that year. In the winter of 1841–42, I had five colonies among sixteen, and in that of 1842–43 six among nine which retained drones till February; and yet only one proved to be queenless in the spring following. Last winter, a beekeeper in my neighborhood had seven colonies, which had expelled all their drones in the preceding fall, yet one of them was queenless. Hence, it is obvious that neither the presence of a few drones in the winter, nor their entire absence, is an infallible indication of queenlessness; and it is, consequently, often exceedingly difficult to form a reliable opinion of the condition of colonies in common hives. It is only when movable comb hives are used, that the true state of the case can be ascertained.

STOEHR.

Answer to an Inquiry made in No. 4, of the Bee Journal,—J. C., Providence, R. I.

Your statement contains the answer within itself.

It was a surplus of queens, (the symptoms of which are the same as are observed when the queen is lost,) that causes the excitement. The queen cell you inserted had nothing to do in quieting the bees.

C. COE.

Union Springs, N. Y.

☞The Baron of Berlepsch has had colonies in his apiary which increased eleven pounds in weight in one day. Mr. Kader, of Mayence, had one which increased twenty-one pounds, and the Rev. Mr. Stein, of the same place, one which increased twenty-eight pounds in a day.

☞The *teeting* of a queen bee is produced by forcing air through the *stigmata* or breathing pores of the tracheal system; and, not as Gundelach supposed, by rubbing against each other the second and third dorsal segments of the abdomen.

☞Please send us names of beekeepers.

Diversities of Cells.

In every hive filled with comb, five different kinds of cells may, at certain seasons, be found, varying in form and size. The much greater number are the small hexagonal *worker cells;* then the larger *drone cells;* and intermediately a few rows of cells larger than the former, and smaller than the latter, which are termed *transition cells.* These are more irregular in shape, many of them being pentagonal. Besides these we may find a few *royal cells*, which are cylindrical within, somewhat deeper than common cells, considerably thicker, and attached virtually to the comb, mouth downwards, like an inverted cup. When large and closed, as they are when containing a royal chrysalis, they appear not unlike a common peanut. Many of these are ornamented with indentations resembling rudimental worker cells. A fifth kind are those *store cells*, or honey receptacles, which are built of such depth as no longer to serve for brood cells. They are used exclusively for storing up honey, and are situated on the upper portion of the combs, and in the corners of the hives. The cells of combs built in surplus honey boxes are usually of this description; and this is the chief reason why brood and pollen are so seldom found in such boxes. They are generally formed by prolonging the cells of opposite ranges of comb to such degree that, when they are capped, a single bee only can pass through the intervening space. They contain the stores of honey which the bees have laid up for their support during the winter months.

The royal cells, built by bees which—having a fertile queen—design to swarm, have a concave and smooth base, and are called *preconstructed* royal cells by the German beekeepers. Those which are built when the bees suddenly lose or are unexpectedly deprived of their queen, have a hexagonal base, showing that they are in reality worker cells transformed and enlarged. These are termed *post-constructed* royal cells. Close inspection of the royal cell, after the mature queen has emerged, will, hence, always enable the apiarian to decide whether they were built by bees designing to swarm, or by such as were merely intent on retrieving their loss. It sometimes occurs that bees after losing their queen, commence to build a number of royal cells, but leave the major portion unfinished; though they widen them somewhat cylindrically, and give them the ordinary depth of worker cells. The larvæ in such are fed like ordinary worker larvæ, but the cells are capped with convex covers, very similar to those given to drone cells, though genuine workers emerge from them. We are not aware that any plausible conjecture has been offered, why the bees leave these cells thus unfinished, or why they cap them after the manner of drone cells—whether by design, or from mere whim.

(From the "Bienenzeitung.")

Aberration of Instinct.

On the 6th of June, last year, I observed that one of my colonies which had previously appeared to be in a thriving condition, was gradually becoming weak, and that no young workers made their appearance. I gave it an overhauling, and found that it contained a drone-producing queen. After removing her and decapitating all the sealed drone brood, I introduced a fertile queen confined in a cage. Though the bees had been very restless, I was surprised to see that they refused to receive the offered queen, continuing for three or four days to manifest their dislike by constant efforts to reach and destroy her. I then took out the combs again, and found that royal cells had been built, and attempts made to rear queens from the remaining drone larvæ. On destroying these, removing all the unsealed brood, and reinserting the imprisoned queen, the bees speedily showed their willingness to receive her, and she was treated with due respect and attention when liberated.

There was obviously an error of instinct in this case, as the bees undertook to rear a queen from drone larvæ rather than accept one already fertile. This was the more surprising as they had not long been used to the presence of a drone-producing queen. If the colony had not been in a movable comb hive it would have been exceedingly difficult, if not impossible, to apply a remedy in this case.

Last spring my brother-in-law had three queenless colonies in his apiary. It was late when he discovered their queenless condition, and one of them was so greatly reduced, that it could only be restored by the insertion of combs with worker brood. Royal cells were started and a queen reared in this colony. When the young queen made her bridal excursion, the bees accompanied her in a body, and clustered on a neighboring tree as a swarm. He hived them as usual; but next day they issued again, and repeated this seven times on different days—change of hive and temporary confinement of the queen having been resorted to in vain to induce them to stay. Finally, the insertion of a comb with eggs and larvæ effected a change of temper, and they suffered the queen to leave unattended.

Here, evidently, an inordinate attachment to their queen, and desire for brood, caused the bees to pursue a course calculated more than any other to defeat their object; as the fecundation of a queen very rarely occurs while a colony is in the act of swarming.

O. Rothe.

Altschau, Feb. 5, 1861.

[For the Bee Journal.]

Prevention of Swarming.

To prevent hives from swarming, several methods have been advocated.

1. Many persons supposing that bees swarm only for want of room, aim to prevent it by furnishing abundance of room, either in the main hive or in the surplus honey receptacles. But every experienced beekeeper is aware that stocks will often swarm without occupying the surplus storage room—or after they have partially filled it with comb; and in Mexico, where bees are often kept in flour barrels, I have seen them swarm when the barrels were not near filled with comb. I have repeatedly had swarms from old gums holding over two bushels, and a few days ago a swarm issued from a stock of Italian bees, to which over two bushels of storage room for surplus honey had been given—two hives being placed over the old stock, in the method described in plate v., fig. 16, of the third edition of my book. The bees had filled the second story, and were busily at work in the third. It is very evident, therefore, that ample storage room cannot always be relied on for preventing swarming.

2. Many devices have been contrived for preventing swarming by contracting the entrance to the hive so as to prevent the queen from leaving, while free egress is allowed the workers. At one time I looked upon what I called my non-swarmer with considerable favor; but longer experience has convinced me that it will not answer. It is true that if the entrance is made exactly five thirty-seconds of an inch high, the queen cannot get out, and the bees after swarming will return to the hive. But such accuracy of adjustment is difficult to obtain, and the bees are seldom reconciled to the *squeezing* necessary to enter the hive, by which many of them have their pollen rubbed off. The whole colony is also thrown into great excitement every day, when the drones attempt to take their flight; and the entrance must be enlarged daily, early in the morning or late in the afternoon, to allow the bees to carry out dead drones and imperfect brood, which they have been dragging for hours about the contracted passage.

3. Clipping the wings of the queen to prevent swarming is an old device, but one which with the ordinary arrangement of hives can never be relied on. A queen without wings feels perfectly competent to accompany the swarm, and will hop off the alighting board and in most cases be lost in the grass. The bees return to the parent stock, to await the development of the young queens, and will then swarm, often three or four times.

4. From some experiments which I have tried this season, I think that I can effectually prevent swarming, without in the least interfering with the natural instincts of the bees.

The hives in which swarming is to be prevented should all have their alighting boards resting on a large board placed on the ground, and the wings of the queens should be clipped in the way described on page 223 of my book; so that if she leaves she may easily crawl back to the hive, when attracted by the loud hum of her returning colony. She will not be disposed to leave often; and the bees will probably aid her in destroying the maturing queens. Of this, however, I shall be more certain after an enlarged course of observations. If the bees should prevent the destruction of the young queens, and the old one should be killed, then the whole plan will fail. Of this, however, I have little fear.

L. L. LANGSTROT

Oxford, Ohio.

[For the "Bee Journal."]

Fertility of the Queen Bee.---Excess of Drones.

In transferring a stock from an old box holding nearly two bushels, I found about 50,000 cells, containing worker brood, and about 10,000 containing drone brood. This queen must therefore have laid nearly 3000 eggs a day. The upper third of the hive was filled with sealed honey.

From another old box, I cut out over 15,000 sealed and unsealed drones. Thousands of drones had already hatched. In examining a movable comb hive belonging to a friend, I found two of the central frames filled with drone brood. The yield of honey from this hive for two seasons had been small. The honey uselessly consumed in rearing and supporting drones in many stock hives, is sufficient to pay a generous interest on the value of the stocks.

L. L. LANGSTROTH.

[For the "Bee Journal."]

Color of Workers and Queens reared from an Italian Queen impregnated by a black drone.

I have an Italian Queen of last year impregnated by a black drone, *all* of whose worker progeny have always been well colored. I have reared, for experimental purposes, a number of queens from her brood, not one of which is well colored—most of them being quite dark, and some of them much darker than many common queens. It seems very singular that the larvæ, which if developed as a worker, would have been strongly colored, should in its transformation into a queen lose all its brilliant yellow.

L. L. LANGSTROTH.

[For the "American Bee Journal."]

Hybridizing.

The spermatheca of an unfecundated queen-bee contains a pellucid liquid. After fecundation and the introduction of the male sperm, this liquid becomes opaque, and appears milk white. Is it certain that there is no subsequent secretion of fluid on the part of the queen? The chief purpose of the liquid found in the spermatheca of a virgin queen seems to be to receive and dilute the male sperm; thereby enabling the spermatozoa to separate and disperse, and thus to pass off singly, in the act of impregnating the egg in its passage down the oviduct. In itself it possesses no fertilizing property; though, as emanating from the queen, it *may* contribute to fix on her progeny, in a greater or less degree, the specific characteristics of her own race. Thus, though a bastardized Italian queen will invariably produce only Italian drones, and occasionally common workers apparently pure, her hybrid brood will not be of uniform character, and much diversity of marking will be observable. A queen bred from the ordinary eggs of such a queen will produce common workers almost exclusively, if fecundated by a common drone; but her drones will in their markings, be of various intermediate grades. But should it happen that a queen is bred from one of her eggs which would have produced a hybrid, and chance to be fecundated by one of the hybrid drones, might not a race constant in these characteristics, be thus perpetuated by extreme care *and great good luck* in breeding?

QUERIST.

SINGULAR FACT.

On the 12th of November, 1855, Mr. F. A. Herling, of Weissenfels, passed a strip of woodland, where wood-choppers were at work clearing off the timber. Some of them had just felled a huge hollow oak tree, in which bees had taken up their abode. They were engaged in securing the honey when Mr. H. reached the scene, and consented to let him have the bees, which he collected, placed in a rude box, and carried home. He then transferred them to a movable comb hive containing five frames with empty combs, and one with sealed honey. On opening the hive next morning to ascertain whether the queen was safe, he found the five combs also well supplied with honey, doubtless deposited by the bees, who had gorged themselves with their own stores when their old domicile was so rudely demolished, and thus carried off a supply nearly sufficient to last them through the ensuing winter.

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Monthly Management.

JULY.

In most sections of the temperate zone, July is, for bee culture, the deciding month—stamping the character of the year, either as good, midling, or bad. It is the real "harvest moon" of the bees. The colony which is to prove profitable to its owner, must gradually diminish the amount of brood it contains, and direct its energies chiefly to the accumulation of stores. This is indeed naturally the general habit of the bees, though they sometimes fail to observe it. Should the weather be moist, and thence better suited to foster brooding than honey gathering, the queen will continue to lay eggs freely, the larvæ will be carefully nursed, and even drone brood regarded with favor. Then if pasturage suddenly fails, the cells vacated by the maturing young will remain empty, and the approach of winter will find the colony ill prepared to endure the long confinement that awaits it. The beekeeper should endeavor, by all possible means, to obviate such result. His policy and his management must hence be regulated according to the weather prevalent during the month. If it be dry and permit the bees to gather honey plentifully, his main concern will be to furnish them with room for garnering their stores, by giving them access to surplus honey-boxes, and placing supers on his smaller hives. But if his bees are in movable comb hives, he can best aid them and secure his own interest by removing some of the full combs and replacing them with empty ones—thus saving them the labor of building, and enabling them to direct all their energies to the ingathering of supplies. The rapidity which they can gather honey must determine the quantity which may be taken away; and while the pasturage continues good, they will only labor the more assiduously if empty cells be constantly within their reach. This serves in reality to stimulate their industry; whereas when they are conscious of possessing an abundance, they are apt to remit their exertions and cease to labor with an activity proportioned to their numbers. The rapid and abundant gathering of honey necessarily tends to restrict brooding, because the cells are supplied with nectar as soon as the young bees emerge, and the queen has none or few in which to deposit eggs.

But if the weather be warm and wet, and pasturage scarce, the beekeeper must endeavor to check brooding as much as possible. This is sometimes effected, in common hives, by inserting a board horizontally immediately between the combs, to prevent the bees from lengthening them. It is better that bees, especially young swarms, should be constrained to fill a small space thoroughly with combs and stores, than that they be permitted to expend honey in extending downward the combs, which would probably remain in large part empty in the fall. They may have need of the honey in the winter, and the empty combs will be of no service to them then. The effectual means, however, of arresting brooding at this season, is found in the confinement of the queen, or her entire removal if she be superannuated, so as to render it doubtful whether she would survive the winter. In fact, as the expulsion of the drones usually takes place in the latter part of this month, this is the proper time for rearing young queens, by the removal of those which are two or three years old, or are less fertile than a good queen should be. Reserve queens reared in advance for this special purpose and kept in nuclii or small stocks, may now be used with great advantage in effecting the change, or supplying colonies which have become queenless after sending forth a swarm, or from which a swarm has drummed out. Parent colonies from which swarms have issued, should be examined five or six weeks after the old queen left, to ascertain whether they contain worker brood. If none can be seen and no young bees are observed, or no disposition is shown to expel the drones, such colonies may be regarded as queenless, and should be supplied with eggs and larvæ to enable them to remedy their loss, though they will more speedily be brought into good condition, if a fertile queen be introduced.

Weak and late swarms should be strengthened by inserting combs containing sealed brood taken from other stocks, and supplying them also with honey. But such supplies should be taken only from very populous colonies, having superabundant stores. If this cannot be done, two or more weak stocks should be united, and the surplus empty combs preserved for use next season. If this is done while the bees are still gathering honey, the combs injured in the operation will speedily be repaired by them, vacant spaces filled, and the whole structure brought into good wintering condition.

When pasturage begins to fail, the bees, accustomed to honey gathering, are prone to attack and rob other colonies, especially such as are queenless. If the population of these is already much reduced, the introduction of even a fertile queen will not often be of permanent advantage. They should rather be forthwith united with some other stock.

But in districts where buckwheat is extensively cultivated, or fall pasturage is abundant, it may even at this late period, be useful to make artificial colonies, especially if the apiarian has fertile queens in reserve, to be used on such occasions. The expediency of doing this depends on the strength or populousness of the colonies, and the extent and quality of the pasturage within their reach. Generally, however, it is better to allow the bees to avail themselves of the opportunity to *cram* their hives thoroughly with supplies for the winter, rather than diminish their ability for efficient labor by subdivision.

In some districts and some years early swarms produce what are called *virgin swarms*. Whether these should be preserved and treated as independent colonies, or caused to return to the parent hive by destroying the queen, depends on the strength of the swarm, the period at which it issues, and the prospect then that they may still be able to provide for their wants in the coming winter. As most beekeepers consider themselves peculiarly favored when *virgin swarms* appear in their apiaries, and flatter themselves that *their* bees will prosper, there is a general disposition to hive and preserve them; and it is hardly likely that any counter suggestions which we might make, would induce the *lucky* beekeeper to adopt a different policy.